

beneath bitumen-bearing rocks as a most conclusive and unexpected support to the validity of the views that I have herein set forth. I therefore, with this argument, for the present leave the subject.

NOTE.—I have quoted thus fully from Dr. T. Sterry Hunt for two reasons; with all his eccentricities, he was a man of untiring industry and a profound interpreter of the phenomena of nature in the light of experiment. Therefore, no writer of recent years has expressed views that are entitled to more respectful consideration. He is also more widely quoted by both American and European writers upon the subject of the origin of bitumens, especially as an exponent of the doctrine that bitumens are indigenous to the rocks in which they are found, than any other author.

HERPETOLOGICAL NOTES.

BY JOHN VAN DENBURGH.

(Read April 1, 1898.)

1. *Bufo boreas in Alaska*.—In the winter of 1896, Mr. A. W. Greeley, a student at Leland Stanford Junior University, gave me for examination two toads which he had "taken swimming in a large lake near Prince William's sound, Alaska, July 15, 1896." These are typical specimens of *Bufo boreas*, distinguishable at a glance from *Bufo halophilus*, and its northern form *B. h. columbiensis*. Unless my memory fails me, no toad has heretofore been recorded as Alaskan, and these specimens are, therefore, of great interest, since they greatly extend to the northward the known range of this family, genus and species upon the Pacific coast.¹ One of these specimens contains eggs which must have been nearly ready for laying.

2. *On the Time of Laying of the Western Gopher Snake in Central California*.—Early in the month of July, 1897, I received a fine, moderately large specimen of the Western Gopher Snake (*Pituophis catenifer*), which had been captured a few days before "in a marsh near Palo Alto," Santa Clara county, Cal. During the next few days this snake lay almost motionless in a small box in my office in the California Academy of Sciences. On the afternoon of

¹Toads have been reported from Gt. Bear Lake.

July 13, however, it became very restless and seriously injured its snout in attempting to find some hole through which it might escape from its prison. The next morning—July 14—to my surprise, several eggs were in the box, and the number was added to at intervals until by noon of the next day nineteen eggs had been laid.

The eggs when first laid are covered with a loose, soft, sticky, parchment-like white membrane. This quickly dries and hardens, shrinking upon the substance of the egg until quite tense, and cementing each egg to the others upon which it is laid. After the membranous shell has become dry it ceases to shrink, and if the substance of the egg be reduced, as by evaporation, wrinkles appear upon its surface. However, the softness of the shell and its power to shrink upon its contents are restored by the application of water.

The eggs as laid formed a great cluster surrounded by the coiled body of the snake. The latter hissed fiercely when the eggs were removed, although she had not shown the slightest resentment when handled on previous days.

3. *The Breeding of Plethodon oregonensis.*—A female salamander of this species with three eggs was brought to me from Mill Valley, Marin county, Cal., where it had been found April 19, 1896. The gentleman who secured them stated that the salamander and eggs had been found together under a decaying log in the redwood woods. These eggs, like those of *Autodax iecamus*,¹ are very large (6 mm. in diameter) and almost or quite without pigment. They were covered with a thin gelatinous coating which caused them to stick together. In my office they were placed with the salamander and some bits of wood and damp moss in a darkened jar. This situation, however, proved to be unsuited to their development, for the eggs soon became covered with mold. The most interesting fact remains to be told. As soon as placed in the jar the salamander took charge of the eggs, lying beside them and holding them in a loop of its tail. Evidently dissatisfied with their position and surroundings, the *Plethodon* moved the eggs from place to place in the jar, holding them always in the crook of its tail. This was done several times in the course of three or four days, and the solicitousness of the salamander continued until the eggs were quite moldy. Finally the eggs of the cluster were broken apart and one was eaten by the salamander. Thinking it probable that this sala-

¹ See *Proc. Cal. Acad. Sci.* (2), v, 1895, p. 777.

mander was a male, I examined it with care, but found that it was a female with well-developed ovaries containing ova of various sizes.

4. *The Colors of a Living Specimen of the Lower Californian Boa, Lichanura trivirgata.*—The California Academy of Sciences recently received, through Mr. F. Billa, a fine specimen of the Lower Californian boa, collected near San José del Cabo. This specimen shows beyond doubt that *Lichanura trivirgata* is perfectly distinct from *L. roseofusca* of northern Lower California and southern California and Arizona. It agrees in coloration with the specimen still in the Philadelphia Academy of Natural Sciences. The snout is strongly protruding. The diameter of the eye is one-third the distance from the orbit to the end of the snout. The true loreals are two on the left and three on the right side. Scale rows forty-one. Gastrosteges two hundred and seventeen.

The following description of its colors was prepared while the snake was yet alive :

Two bands of rich drab-gray, with a slight creamy cast, separating the very dark seal-brown ground color into three longitudinal stripes. Belly and sides creamy white, irregularly dotted and blotched with seal-brown. Head pure drab-gray, with markings of seal-brown above, uniform whitish below.

This snake had the curious habit, often shown by Charina, of coiling itself into a compact mass or ball when disturbed.

5. *On the Type Specimen of Crotalus oregonus.*—In the collection of the Philadelphia Academy of Natural Sciences is a jar which bears two labels, as follows :

Crotalus oregonus Holb., *N. Amer. Herp.*, Vol. iii, Pl. 3. Mr. Nuttall. Type. Oregon.

Crotalus oregonus Holb. 840. Type. T. Nuttall. Oregon.

This jar contains a young rattlesnake which agrees with the original description of *Crotalus oregonus* in all respects except in length and the absence of rattles. The total length is only fourteen and one-eighth inches. I see no reason to doubt that this is the type of *Crotalus oregonus*.

This specimen exhibits all the characters of the species long known under the name *Crotalus lucifer*. The light postocular stripe is more than two scales wide and the dark streak below it begins below the middle of the eye. The snake now almost universally known as *Crotalus lucifer* must, therefore, in the future be called *Crotalus oregonus* Holbrook.